REMARKS

Claims 67-76 are currently pending. Those claims stand rejected under 35 U.S.C. §102(e) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. Patent Number 6,473,648 to Prutchi et al. Reconsideration is requested.

Claim 67 is directed to a cardiac stimulation device that includes a first pair of electrodes configured for placement internally in a patient and in operable association with the patient's heart. A current source produces a current between the first pair of electrodes. A second pair of electrodes is configured for placement internally in a patient, with at least one of the electrodes being configured for placement in association with the left side of the patient's heart. A voltage measuring circuit measures a voltage between the second pair of electrode in response to the current produced by the current source. An impedance measuring circuit determines an impedance value as a function of the current produced by the current source and the voltage measured by the voltage measuring circuit. A stimulation circuit is associated with the impedance measuring circuit and configured to stimulate the patient's heart as a function of the measured impedance.

Thus, the present invention provides a current between the first pair of electrodes, and a voltage is measured between the second pair of electrodes, where one of the electrodes is associated with the left side of the heart. Therefore, an impedance measurement is made that represents the impedance of the left side of the patient's heart. The impedance measurement is then used to control the stimulation applied to the patient's heart, as a function of the measured left-side impedance.

In contrast, the Prutchi et al. reference discloses a system that determines a lead/tissue impedance value R_L that "generally represents the combined resistance of the lead 505 and the heart 250" (Col. 9, lines 32-33). As described at Column 12, lines 49-52, R_L provides "an accurate characterization of the lead/tissue impedance and assist physicians in monitoring lead integrity, device longevity, and current, change, and energy delivered to the heart tissue."

Thus, rather than providing the impedance value of the heart tissue, Prutchi et al. provide a combined lead/tissue impedance value to detect problems with lead integrity, or to be used to detect the amount of energy delivered to the heart tissue. However, Prutchi et al. fail to teach or suggest determining the impedance measured across the heart tissue. In particular, nowhere do Prutchi et al. teach or in any way suggest providing an impedance value associated with the left side of the heart.

In fact, Prutchi et al. do not teach or even suggest placing a lead in a location associated with the left side of the heart. Rather, Prutchi et al. disclose placing one lead in the right atrium and another in the right ventricle (col. 2, lines 33-35). Thus, not only do Prutchi et al. fail to disclose a system that measures the heart impedance, nowhere do they teach making measurements using a left-sided electrode to determine tissue impedances of the left side of the heart.

Furthermore, nowhere do Prutchi et al. teach using a left-sided impedance measurement to control delivery of stimulation to the heart. Prutchi et al. merely disclose using the lead/tissue impedance measurements to detect lead fractures and energy delivered to the heart tissue. Nowhere do Prutchi et al. teach an adaptive system that responds to changing tissue impedance values by adapting the therapy delivered to the heart. For example, in the case of congestive heart failure, Applicants' claimed invention is adaptive to progression of the congestive heart failure condition to, among other things, change pacing modes, pacing rates, interchamber delays, and the like. Prutchi et al. fail to disclose this.

CONCLUSION

In light of the above remarks, Applicants respectfully submit that the pending claims are in condition for allowance, and request a notice indicating allowance of the claims.

Respectfully submitted,

8/4/03
Date

Derrick W. Reed
Registration No. 40,138
Attorney for Applicant(s)

Pacesetter, Inc.
15900 Valley View Court
Sylmar, CA 91392
818/493-2200
818/362-4795 (fax)